



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/800,268	03/05/2001	Stephen C. Pollmann	ENSEMB.003A	3763

20995 7590 06/28/2002

KNOBBE MARTENS OLSON & BEAR LLP  
620 NEWPORT CENTER DRIVE  
SIXTEENTH FLOOR  
NEWPORT BEACH, CA 92660

EXAMINER

LUGO, DAVID B

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 06/28/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/800,268	POLLMANN ET AL.	77
	<b>Examiner</b>	<b>Art Unit</b>	
	David B. Lugo	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 25 March 2002.
- 2a) This action is **FINAL**.                  2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 26-94 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 26-36, 40-91 and 94 is/are rejected.
- 7) Claim(s) 37-39, 92 and 93 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 25 June 2001 is/are: a) accepted or b) objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.

- 4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other:

## **DETAILED ACTION**

### *Drawings*

1. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

### *Specification*

2. The disclosure is objected to because of the following informalities:
  - a. Page 2, line 23, "gain droop" should be --gain drop-- as in gain drop compensation module 941, shown in Fig. 3. All occurrences of "gain droop" in the disclosure should likewise be corrected.
  - b. Page 7, line 7, "modem 135" should be --modem 100-- to correspond with Fig. 1. All other occurrences should likewise be corrected.  
Appropriate correction is required.

### *Claim Objections*

3. Claims 63-71 and 73 are objected to because of the following informalities:
  - a. Claim 63, line 3, and claim 73, line 2, "gain droop" should be --gain drop--.
  - b. Claim 73, line 5 recites "a phase calculator circuit configured to determine the gain of the equalizer". Use of a phase calculator to determine a gain is confusing and should be corrected. Applicant is further requested to point out where in the specification it describes using a phase calculator to determine the gain of the equalizer.  
Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 57-60 and 86-89 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 57 recites a method for operation of a modem system comprising determining an expected modulation type for the subsequent burst from the remote site based on the determined initial phase and the initial gain for the next burst from the remote site.

However, the limitation “determining an expected modulation type for the subsequent burst from the remote site based on the determined initial phase and the initial gain” is not supported by the specification of the instant application.

The Examiner requests that the Applicant point out where in the detailed description of the invention it states, “determining an expected modulation type for the subsequent burst form the remote site based on the determined initial phase and the initial gain”.

Claim 86 recites a method for operation of a modem system comprising determining a gain value and a phase value for a first data burst from a remote site, comparing the gain value and phase value based on an adaptive modulation algorithm, and determining an expected modulation type for a second data burst from the remote site based on the comparison.

However, the limitations “comparing the gain value and phase value based on an adaptive modulation algorithm” and “determining an expected modulation type for a second burst from the remote site based on the comparison” is not supported by the specification of the instant application.

The Examiner requests that the Applicant point out where in the detailed description of the invention it states, comparing the gain value and phase value based on an adaptive modulation algorithm” and “determining an expected modulation type for a second burst from the remote site based on the comparison”.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 26-28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996.

Regarding claim 26, Kamerman '989 teaches a modem system for demodulating data from a plurality of remote sites where data is received and used to determine equalizer coefficients and channel parameters corresponding to various channel characteristics including attenuation, amplitude and delay distortion and phase impairments. The channel parameters and equalizer coefficients are stored in a memory, where on subsequent transmissions from a remote, the modem is identified and the parameters and coefficients are loaded from memory (see

column 1 lines 16-60). Upon an initial transmission from a current remote followed by a transmission which is the second transmission from a next remote, the master modem will store the channel parameters and equalizer coefficients corresponding to the first transmission from said current remote, and replace the channel parameters and equalizer coefficients for the current remote with the parameters and tap values from said next remote. Kamerman '989 further discloses a timing initialization control circuit 138 which is considered to provide an initial phase and a gain control circuit 220 which provides an initial gain (see column 12 lines 63-67).

Kamerman '996 teaches that the signal from an equalizer is used to provide a phase error output signal which is applied to a phase jitter compensation determination circuit (see abstract).

It would have been obvious to one of ordinary skill in the art to incorporate the determination of a phase error output signal for phase compensation in the modem system of Kamerman '989 so fast phase jitter adaptation may be achieved.

Regarding claims 27 and 28, the channel parameters and equalizer coefficients are retrieved from the receiver parameter storage and are thus determined based on a previous burst, and the parameters are adjusted to the channel before being stored in memory.

Regarding claim 30, the parameters retrieved from memory are associated with each remote modem.

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996 as applied to claim 26 above, and further in view of LeFever U.S. Patent 4,599,732.

Regarding claim 29, Kamerman fails to disclose that the equalizer error is applied to a numerically controlled oscillator.

LeFever discloses an NCO 33 for controlling synchronization according to a signal applied from processor 41, as described in column 4 lines 45-50.

It would have been obvious to one or ordinary skill in the art to apply the phase error signal used for phase jitter compensation as taught by Kamerman to a numerically controlled oscillator (NCO) as taught by LeFever to control bit synchronization.

9. Claims 31-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996 as applied to claim 26 above, and further in view of Murakami U.S. Patent 4,575,857 and Chevillat et al. U.S. Patent 4,849,989.

Regarding claim 31, Kamerman fails to expressly disclose that a gain constant is determined based on the equalizer tap values and the scaling of the input signal of a next burst to the equalizer to achieve a gain value of 1.

Murakami shows in Fig. 2 an automatic equalizer having controllable tap gains and a tap correcting means for successively correcting the tap gains of the transversal filter.

Chevillat teaches a method for rapid gain acquisition in a modem receiver where a scaling means 59 uses a gain correction factor initially set to 1.0.

It would have been obvious to one or ordinary skill in the art to use the automatic gain control method taught by Chevillat and the equalizer with controllable tap gains as taught by Murakami in the modem system of Kamerman '989 so no portion of the signal is lost due to rapid gain changes as stated by Chevillat in column 3 lines 7-20 and so linear distortion may be removed as stated by Murakami (see abstract).

Regarding claims 32, 33, 35, and 36, Murakami further states that the main tap is set to one and the other taps are set to zero (see claim 2).

Regarding claim 34, Kamerman further teaches the storage of equalizer coefficient values after a transmission burst.

10. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996 as applied to claim 26 above, and further in view of Zuranski et al. U.S. Patent 6,263,077.

Regarding claims 40 and 41, Kamerman teaches a modem system where data bursts from a plurality of remote sites are demodulated using stored channel parameters for each remote site and equalizer coefficients associated with a received burst are retrieved and stored in a receiver parameter storage, but does not expressly disclose the determination of noise and error values for validating or invalidating the parameter.

Zuranski teaches a digital subscriber line communication system having an error processor 96 as shown in Fig. 4 comprising a Reed-Solomon decoder 120 and a mean-squared error calculator 122 that provides an indication of the signal-to-noise ratio (see column 13 lines 6-17). Zuranski further teaches that error processor 96 determines that a particular number of errors are occurring or that the noise exceeds a certain threshold, the current parameters are no longer valid and rapid retrain circuit 94 is invoked.

It would have been obvious to one of ordinary skill in the art to use the error and noise indicators as taught by Zuranski in the modem system of Kamerman to maintain high speed and accurate communication in the presence of communication line impairments.

Art Unit: 2634

11. Claims 42-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996 as applied to claim 26 above, and further in view of Webb U.S. Patent 5,828,695 (disclosed by Applicant).

Regarding claim 42, Kamerman teaches a preamble used in equalizer training to minimize errors, but fails to teach that the preamble is a two-part preamble where the first part is modulated with a lower order technique and the second part is modulated using a higher order technique.

Webb discloses a frame structure where a first part is modulated with a lower order modulation technique and a second part is modulated with a higher order modulation technique (see abstract, Figs. 1 and 2).

It would have been obvious to one or ordinary skill in the art to use the frame structure of Webb in the modem system of Kamerman so the system can adapt to transmission conditions.

Regarding claim 43, Webb discloses that the lower order technique is QPSK.

Regarding claims 44-46, Webb shows that the higher order technique may be QAM 64 or QAM 16 in Fig. 2, and the first part and the second part include end points and middle QAM points, as shown in Fig. 1.

Regarding claim 47, Kamerman discloses that the training signal is used for timing recovery.

Regarding claim 48, Webb discloses that the bit error rate is monitored, and the modulation scheme is adjusted accordingly. It would have been obvious to one or ordinary skill in the art to minimize all errors including a bit error rate and a Reed Solomon error rate to increase the accuracy in the demodulation of the data.

Art Unit: 2634

12. Claims 49-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996 as applied to claim 26 above, and further in view of Dailey et al. U.S. Patent 5,487,181.

Regarding claim 49, Kamerman fails to teach a modem system as described above, but fails to teach the use of interrupts in response to modem system errors.

Dailey teaches the use of interrupts in a modem where an interrupt is generated in accordance with modem system errors. Dailey further discloses the use of a reset bit for controlling operation of a buffer in column 12 lines 55-61. One of ordinary skill in the art would recognize that a reset bit may be used for flushing, realigning, and reprogramming the buffer so the modem interface may be restarted once the buffer is reprogrammed so incorrect data corresponding to the modem system error can be replaced by correct data.

Regarding claims 50-53, Dailey further discloses that interrupts may be generated in both receive and transmit modes. Therefore the corresponding reset bit may be a transmit-reset bit or a receive-reset bit.

Regarding claim 54, Dailey further discloses that an interrupt may be generated when the buffer has an underflow or overflow. One of ordinary skill in the art would recognize that these modem system errors might occur due to differences in data processing rates.

Regarding claim 55, one of ordinary skill in the art would recognize that an interrupt might be generated in response to the modem receiving cyclic redundancy check packets, so the system can adjust to errors in the transmission.

Regarding claim 56, it is well known to use QAM 64 so multiple data bits may be represented by a single symbol.

13. Claims 57-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996 as applied to claim 26 above, and further in view of Foster, Jr. et al. U.S. Patent 6,016,313 (disclosed by Applicant).

Regarding claim 57, Kamerman fails to teach a modem system as described above, but fails to teach that an expected modulation type for a received burst is determined and an adaptation factor for the equalizer is based on the expected modulation type.

Foster discloses a variable rate modem that uses different modulation schemes for various remote modems, as described in column 7, lines 1-35. Depending on the expected modulation scheme, one or ordinary skill in the art would recognize that different parameters would be necessary for equalization of the signal.

It would have been obvious to one or ordinary skill in the art to include the use of a variable rate modem as taught by Foster in the modem system of Kamerman to increase spectral efficiency.

Regarding claims 58-60, Foster discloses the use of 4 QAM (QPSK) encoding up to 256 QAM encoding.

14. Claim 61 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Kamerman U.S. Patent 4,849,996 as applied to claim 26 above, and further in view of Tsujimoto U.S. Patent 6,075,808.

Kamerman discloses a modem system that demodulates data from a plurality of remote sites using stored channel parameters, but does not expressly disclose correlating the input and output of an equalizer, determining an angle of correction based on the correlation, and shifting the incoming burst by applying the angle of correction to the incoming burst.

Tsujimoto discloses a circuit where correlators 319 and 320 are used to correlate the input and output of an adaptive equalizer 321 to adjust the input to the equalizer (see Fig. 4).

It would have been obvious to one of ordinary skill in the art to use the teaching of Tsujimoto in the modem system of Kamerman for cancellation of ISI as stated by Tsujimoto in column 6 lines 48-54.

15. Claims 63-67, 71, and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Murakami U.S. Patent 4,575,857 and Chevillat et al. U.S. Patent 4,849,989.

Regarding claim 63, Kamerman teaches a modem system where data bursts from a plurality of remote sites are demodulated using stored channel parameters for each remote site and equalizer coefficients associated with a received burst are retrieved, but does not expressly disclose that a gain constant is determined based on the equalizer tap values and the scaling of the input signal of a next burst to the equalizer to achieve a gain value of 1.

Murakami shows in Fig. 2 an automatic equalizer having controllable tap gains and a tap correcting means for successively correcting the tap gains of the transversal filter.

Chevillat teaches a method for rapid gain acquisition in a modem receiver where a scaling means 59 uses a gain correction factor initially set to 1.0.

It would have been obvious to one of ordinary skill in the art to use the automatic gain control method taught by Chevillat and the equalizer with controllable tap gains as taught by Murakami in the modem system of Kamerman '989 so no portion of the signal is lost due to rapid gain changes as stated by Chevillat in column 3 lines 7-20 and so linear distortion may be removed as stated by Murakami (see abstract).

Regarding claims 64, 66, 67, and 71, Murakami further states that the main tap is set to one and the other taps are set to zero (see claim 2).

Regarding claim 65, Kamerman further teaches the storage of equalizer coefficient values after a transmission burst.

Regarding claim 73, Kamerman teaches a modem system where data bursts from a plurality of remote sites are demodulated using stored channel parameters for each remote site where equalizer coefficients associated with a received burst are retrieved, but does not expressly disclose that the gain of the equalizer is applied to an equalizer coefficient.

Chevillat teaches gain computation means connected to the equalizer 27.

Murakami shows in Fig. 2 an automatic equalizer having controllable tap gains and a tap correcting means for successively correcting the tap gains of the transversal filter.

It would have been obvious to one or ordinary skill in the art to use the automatic gain control method taught by Chevillat and the equalizer with controllable tap gains as taught by Murakami in the modem system of Kamerman '989 so no portion of the signal is lost due to rapid gain changes as stated by Chevillat in column 3 lines 7-20 and so linear distortion may be removed as stated by Murakami (see abstract).

16. Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Acampora et al. U.S. Patent 4,232,197, Goldstein et al. U.S. Patent 6,002,713, and Zuranski et al. U.S. Patent 6,263,077.

Regarding claim 72, Kamerman teaches a modem system where data bursts from a plurality of remote sites are demodulated using stored channel parameters for each remote site

Art Unit: 2634

and equalizer coefficients associated with a received burst are retrieved and stored in a receiver parameter storage.

Kamerman does not expressly disclose a control module configured to determine the expected sequence of bursts from a plurality of remote sites, a feed forward tap update module configured to generate equalizer tap values based on an initial gain and equalizer error and an adaptive filter in communication with the feed forward tap update module.

Acampora teaches processing circuitry for detecting markers indicating the sequence of bursts from a number of remote sites.

It would have been obvious to one of ordinary skill in the art to use processing circuitry as taught by Acampora in the modem system of Kamerman data received from a plurality of remote locations can be accurately determined and processed.

Goldstein discloses a feed forward tap update module 131 that generates tap values used by feed forward equalizer 132 using gain coefficients ( $1+g$ ) and equalizer error ( $e_g$ ) determined from a training signal to correct for distortion and interference.

It would have been obvious to one or ordinary skill in the art to use an equalizer arrangement as taught by Goldstein in the system of Kamerman so the modem function properly in the presence of interference.

Regarding the limitations of a first and second temporary buffer, one of ordinary skill in the art would recognize that in order to store or retrieve information to or/from a memory location, temporary buffers are necessary so data is not overwritten in the transfer process.

17. Claims 74, 75, and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Zuranski et al. U.S. Patent 6,263,077.

Regarding claim 74, Kamerman teaches a modem system where data bursts from a plurality of remote sites are demodulated using stored channel parameters for each remote site and equalizer coefficients associated with a received burst are retrieved and stored in a receiver parameter storage, but does not expressly disclose the determination of noise and error values for validating or invalidating the parameter.

Zuranski teaches a digital subscriber line communication system having an error processor 96 as shown in Fig. 4 comprising a Reed-Solomon decoder 120 and a mean-squared error calculator 122 that provides an indication of the signal-to-noise ratio (see column 13 lines 6-17). Zuranski further teaches that error processor 96 determines that a particular number of errors are occurring or that the noise exceeds a certain threshold, the current parameters are no longer valid and rapid retrain circuit 94 is invoked.

It would have been obvious to one of ordinary skill in the art to use the error and noise indicators as taught by Zuranski in the modem system of Kamerman to maintain high speed and accurate communication in the presence of communication line impairments.

Regarding claim 75, it would have been obvious to one of ordinary skill in the art to implement the method in a Time Division Duplex system so bi-directional communication may be established.

Regarding claim 90, Kamerman teaches a modem system where data bursts from a plurality of remote sites are demodulated using stored channel parameters for each remote site and equalizer coefficients associated with a received burst are retrieved, but does not expressly disclose a Reed Solomon decoder and a signal to noise ratio calculator for determining channel characteristics used in the determination of an adaptation factor for use with incoming data.

Zuranski teaches a digital subscriber line communication system having an error processor 96 as shown in Fig. 4 comprising a Reed-Solomon decoder 120 and a mean-squared error calculator 122 that provides an indication of the signal-to-noise ratio (see column 13 lines 6-17). The error conditions indicated by the Reed-Solomon decoder and the mean-squared error calculator are used by the modem to adapt the communication parameters for incoming data, as described in column 11 line 60 to column 12 line 4.

It would have been obvious to one of ordinary skill in the art to use the error and noise indicators as taught by Zuranski in the modem system of Kamerman to maintain high speed and accurate communication in the presence of communication line impairments.

18. Claims 76 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Acampora et al. U.S. Patent 4,232,197 and Zuranski et al. U.S. Patent 6,263,077.

Regarding claim 76, Kamerman teaches a modem system where data bursts from a plurality of remote sites are demodulated using stored channel parameters for each remote site and equalizer coefficients associated with a received burst are retrieved and stored in a receiver parameter storage, but does not expressly disclose a control module configured to determine the expected sequence of bursts from a plurality of remote sites and the determination of noise and error values for validating or invalidating the parameter.

Acampora teaches processing circuitry for detecting markers indicating the sequence of bursts from a number of remote sites.

It would have been obvious to one of ordinary skill in the art to use processing circuitry as taught by Acampora in the modem system of Kamerman so the order of the received data can be accurately determined and processed.

Zuranski teaches a digital subscriber line communication system having an error processor 96 as shown in Fig. 4 comprising a Reed-Solomon decoder 120 and a mean-squared error calculator 122 that provides an indication of the signal-to-noise ratio (see column 13 lines 6-17). Zuranski further teaches that error processor 96 determines whether a particular number of errors occur or whether noise exceeds a certain threshold.

It would have been obvious to one of ordinary skill in the art to use the error and noise indicators as taught by Zuranski in the modem system of Kamerman to maintain high speed and accurate communication in the presence of communication line impairments.

Regarding claim 77, it would have been obvious to one of ordinary skill in the art to implement the method in a Time Division Duplex system so bi-directional communication may be established.

19. Claims 78-84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,996 in view of Webb U.S. Patent 5,828,695 (disclosed by Applicant).

Regarding claim 78, Kamerman teaches a preamble used in equalizer training to minimize errors, but fails to teach that the preamble is a two-part preamble where the first part is modulated with a lower order technique and the second part is modulated using a higher order technique.

Webb discloses a frame structure where a first part is modulated with a lower order modulation technique and a second part is modulated with a higher order modulation technique (see abstract, Figs. 1 and 2).

It would have been obvious to one of ordinary skill in the art to use the frame structure of Webb in the modem system of Kamerman so the system can adapt to transmission conditions.

Regarding claim 79, Webb discloses that the lower order technique is QPSK.

Regarding claims 80-82, Webb shows that the higher order technique may be QAM 64 or QAM 16 in Fig. 2, and the first part and the second part include end points and middle QAM points, as shown in Fig. 1.

Regarding claim 83, Kamerman discloses that the training signal is used for timing recovery.

Regarding claim 84, Webb discloses that the system is adapted to time division duplex transmission.

20. Claim 85 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,996 in view of Goldstein et al. U.S. Patent 6,002,713.

Kamerman discloses a modem system that demodulates data from a plurality of remote sites using stored channel parameters, but does not expressly disclose a feed forward tap update module configured to generate equalizer tap values based on an initial gain and equalizer error and an adaptive filter in communication with the feed forward tap update module.

Goldstein discloses a feed forward tap update module 131 that generates tap values used by feed forward equalizer 132 using gain coefficients ( $1+g$ ) and equalizer error ( $e_g$ ) determined from a training signal to correct for distortion and interference.

It would have been obvious to one or ordinary skill in the art to use an equalizer arrangement as taught by Goldstein in the system of Kamerman so the modem function properly in the presence of interference.

21. Claims 86-89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Foster, Jr. et al. U.S. Patent 6,016,313 (disclosed by Applicant).

Regarding claim 86, Kamerman discloses a modem system that demodulates data from a plurality of remote sites using stored channel parameters, but does not expressly disclose that an expected modulation type for a received burst is determined and an adaptation factor for the equalizer is based on the expected modulation type.

Foster discloses a variable rate modem that uses different modulation schemes for various remote modems based on communication attributes, as described in column 7, lines 1-35. Depending on the expected modulation scheme, one or ordinary skill in the art would recognize that different parameters would be necessary for equalization of the signal.

It would have been obvious to one or ordinary skill in the art to include the use of a variable rate modem as taught by Foster in the modem system of Kamerman to increase spectral efficiency.

Regarding claims 87-89, Foster discloses the use of 4 QAM (QPSK) encoding up to 256 QAM encoding.

22. Claim 91 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,989 in view of Tsujimoto U.S. Patent 6,075,808.

Kamerman discloses a modem system that demodulates data from a plurality of remote sites using stored channel parameters, but does not expressly disclose correlating the input and

output of an equalizer, determining an angle of correction based on the correlation, and shifting the incoming burst by applying the angle of correction to the incoming burst.

Tsujimoto discloses a circuit where correlators 319 and 320 are used to correlate the input and output of an adaptive equalizer 321 to adjust the input to the equalizer (see Fig. 4).

It would have been obvious to one of ordinary skill in the art to use the teaching of Tsujimoto in the modem system of Kamerman for cancellation of ISI as stated by Tsujimoto in column 6 lines 48-54.

23. Claim 94 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamerman U.S. Patent 4,849,996 in view of Saito et al. U.S. Patent 5,566,210.

Kamerman discloses a modem system that demodulates data from a plurality of remote sites using stored channel parameters, but does not expressly disclose a decision feedback equalizer adaptation module configured to determine an angle of correction, and shifting the data by applying the angle of correction to the incoming data

Saito discloses in Fig. 2 a phase characteristic predicting portion 16 for predicting a phase error in the output signal of a feed forward equalizer 9 and a correction portion 19 for correcting the phase difference using a rotation angle for correction (see column 6 lines 3-39 and column 2 lines 21-34).

It would have been obvious to one of ordinary skill in the art to include the teaching of a phase predicting and correcting circuit disclosed by Saito in the system of Kamerman '996 in order for the data determination process to be accurately carried out.

***Allowable Subject Matter***

24. Claims 37-39, 62, 92, and 93 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
25. Claims 68-70 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **David Lugo** whose telephone number is **(703) 305-0954**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at **(703) 305-4714**.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
Washington, D.C. 20231

**or faxed to:**

**(703) 872-9314 (for Technology Center 2600 only)**

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is **(703) 306-0377**.

6/21/02

David B. Lugo  
Patent Examiner  
  
STEPHEN CHIN  
SUPERVISORY PATENT EXAMINEE  
TECHNOLOGY CENTER 2600